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FEED MIXTURE INCLUDES SAWDUST--An experiment at the 1 May Unified Agricultural Cooperative in Trnava to save grain by replacing 20 percent of feed mixture for hogs with hydrolyzed sawdust has proved successful. Only sawdust from hardwood is used, which is easily available from the wood-processing plants. Hogs fed with this mixture attained daily weight increases of 72 decagrams compared with 68 decagrams for hogs fed with regular feed mixture. The experimental fodder also made hogs satiated, whereas regular fodder made hogs restless and unsatiated. Additional experiments in this line will be conducted by the regional station of the Institute of Scientific System of Agriculture in Levice. [Bratislava SMENA in Slovak 11 Feb 82 p 1]

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CONDITIONS, POSSIBILITIES FOR WORKING ABROAD REVEALED

Budapest MUSZAKI ELET in Hungarian 27 Dec 81 p 9

[Interview with Janos Gardos, department head of the Office of Technical-Scientific Cooperation, by Erika Mocsari; date and place not specified]

[Text] [Question] Looking at the heart of the matter, we asked Janos Gardos, department head of TESCO [Office of Technical-Scientific Cooperation], this question: "Is it true that the technical intelligentsia is not familiar with the conditions for employment abroad?" Recently we had become aware that the technical intelligentsia, primarily engineers working in factories, do not exactly know where and how they can apply for such employment.

[Answer] The question is an exaggeration. In recent decades, approximately 10,000 Hungarian specialists--to be sure not all of them technical--have worked in developing countries; almost 1,000 are engaged in Third World countries.

[Question] How does TESCO publicize the opportunities?

[Answer] It is our goal that as many persons as possible should be aware of the invitations for applications and know of the opportunities. To this end, we publish many announcements regarding the invitations on radio and television, in daily newspapers and trade papers. We also publish detailed announcements in journals.

[Question] How should one apply and what must the applicant know?

[Answer] The basic condition is a number of years of professional experience and a knowledge of languages. As well known, a significant share of the Hungarian technical intelligentsia speaks primarily German, while we send specialists to English, French, Spanish and Portuguese language areas. The first problem begins here. For example, if someone applies for a teaching job, it is not sufficient for him to know the language of the area; he must also have passed a proficiency examination. In fact, a degree is also desirable. Moreover, the applicant must also be supported by his own factory and its superior authority. If the applicant takes the position, he is on leave without pay during his mission, and the employer must take him back upon his return home. During his absence, he is given a specified salary by the Ministry of Finance.

Frequently, the employing enterprise will not release the technician but will classify him as indispensable. In this case, unfortunately, TESCO cannot send him abroad.

[Question] Can Hungarian specialists still apply for work in 1982, and if so for what areas would TESCO accept applicants?

[Answer] There are still many vacant positions for 1982. One of our most important partners is Libya, where the Hungarians abroad are engaged chiefly in the public health area. But there are still many other vacant positions for 1982. For example, we are searching for technical teachers and for experts in water management. The water management department of the Libyan Ministry of Agriculture has asked us for 15 experts to set up the water management organization. We have three to four applicants. Nigeria would welcome applications by technicians who have a scientific degree, speak English, have several years of teaching experience at home and would be willing to teach at universities (in the various provinces). In addition, Nigeria has a demand for a large number of Hungarian specialists in architecture, primarily in the implementation of urban planning programs. Tanzania has primarily a need for university instructors, economists and architects. Here the condition for application is at least 10 years of professional experience and a knowledge of English. For Mozambique we want machine industry specialists with a knowledge of the Portuguese language, primarily in the vehicle industry area and in certain other machine industry trades. Architects, mathematics instructors, physicists and biology teachers can also apply for positions in this area. Mechanical engineers, weak-current engineers, technicians in agricultural machinery repair, automobile industry engineers and hydraulic specialists may apply for assignments to Angola in 1982. We are looking for strong-current engineers, mechanical engineers and architects to send to Iraq. Algeria has asked us for about 60 technicians. These positions are still unfilled.

The selected examples from these countries demonstrate that we would welcome the participation of many technicians. Of course, I did not mention the broad-scale demand abroad for public health workers. Therefore, if anyone should want to apply for a multi-year foreign assignment and would like to become familiar with the details, we can give additional information at the TESCO foreign operations department (Nagy Lajos kiraly ut 202, Budapest 14).

[Question] According to our information, TESCO has some other foreign business opportunities.

[Answer] Yes, we have. The examples mentioned were taken primarily from foreign jobs in the framework of technical-scientific agreements. In addition, TESCO recently has fulfilled many foreign commissions. These have been, for example, in road construction, installation, and the planning and implementation of hospitals and other communal facilities. We have close business ties with many Hungarian planning institutes and enterprises. We regularly send Hungarian specialists to carry out their assignments. I might give a number of examples: in Algeria, stadium construction and the planning and operation of various hospitals; in Nigeria, city stadium planning; in Libya, the planning of railroad construction tasks, the planning and operation of hospitals and the implementation of water management programs. If a technician desires to represent Hungary abroad, he can apply at our office independently of the application system framework in which an assignment might be available.

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HUNGARY

NEW APPROACHES TO HIGH PERFORMANCE SYSTEMS, USSR

Budapest SZAMITASTECHNIKA in Hungarian Oct 81, p 4-5

[Article by Viktor Aladyev: "Parallel Information Processing, Cell Automats, Parallel Processors, Multiprocessors: A New Approach to High Performance Systems"]

> [Text] The concluding article of our series, which has been appearing since the first of December 1980, offers a glimpse of the concept, methods and achievements of the school of Soviet cell automat research led by Aladyev.
>
> With this article the editors of our journal are making up for an omission, informing the readers about the future of the ESZR [Uniform Computer Technology System] and trends which will certainly affect the computer technology face of our homeland also.
>
> The work of the Aladyev group cannot be regarded as an isolated, ad hoc attempt, an individual searching for paths by scientists on the periphery of research, who must "prove themselves." Soviet cell automat research takes place in an organized way in the Tallinn section of the Soviet Technical Design Institute.
>
> It is enough to leaf through Aladyev's 267 page monograph titled "Mathematical Theory of Homogeneous Structures and Their Applications" (Tallinn, Valgus, 1980) and the bibliography consisting of 210 citations to get a picture of the place occupied by Soviet cell automat research in the world. Even listing the co-authors suggests much: Yefimof, Osipov, Klushnyikov, Polyekov, Fishman, etc. Not even to speak of others working on the theme such as Shcherbakov, Lukashevich, Vinograd, Makarevski, Glushkov, Varshavskiy, Yevreynov, Kosarov, Vasilyev, Chadeyev, Horochevski, Golovkin, Podkolzin and others. --the editors.

The Limits of the Serial Principle

The time is approaching when the serial processing principle of the Neumann type--which is used as a basis for the most extensive modern electronic computers--will begin to play a retrograde role in the development of very efficient information processing systems. The individual calculating machine model recommended by Janos Neumann in the 1940's is the basis for modern computer technology and the starting point for the so-called Neumann approach to computation.

The inclusion of automated processing systems in the currently greatly expanding applications areas results in an increase in the quantity and complexity of the information to be processed, which puts higher demands on the capacity of the computer technology which can be used. At the same time, the development of computer technology (within the framework of the serial processing principle) is certainly approaching saturation, because the presently existing electronic computers are not far from the theoretical limits of the operational speed of such systems, which are defined by the physical properties of the components.

But the theoretical limit is set by the serial model of processing. As a result any increase in operational speed is accompanied by significant costs and this cannot but have an effect on the development of information processing systems and the economic efficiency of their operation. As a result of all this there is a need to seek for new basic principles in the area of the structure of computer systems and, actually, in the area of the organization of the computing process.

Upon What Does Performance Depend?

The performance of computer systems is determined by a number of factors among which, in my opinion, the following are worthy of mention: on the one hand the element base and architecture of the computer systems and on the other hand the algorithmic and information structure of the tasks to be solved in the computer systems. While the first factor (in this regard) defines to a significant degree the absolute performance capacity of the computer systems (whatever the task), the latter influences the relative performance capacity, which depends on the tasks to be solved. Thus improving the element base and architecture of the computer systems increases the processing speed of every task to be solved but by improving the structure of the concrete task we increase the processing speed of the given task with an unchanged organization of the computer system. It follows from this that the processing speed of a task is determined by the absolute performance capacity of the computer system and by its relative performance capacity as well. In the event of an optimal correspondence between the architecture of the computer system and the structure of the task this speed will be the greatest--other factors being equal.

Within the framework of the serial computing model the information processing speed has been and is being increased in all the above directions, cultivating the absolute and relative performance capacity of the computer systems. For example, we can easily see from the succession of three generations of electronic computers the ways in which the element base and architecture of computer systems have been improved, which resulted in increasing absolute performance capacity. The results achieved in the areas of the theory of serial processing algorithms and of the design of data structures, on the other hand, helped in large measure in the solution of problems connected with the construction of fast algorithms and with an improvement in the information structure of tasks to be solved. Thus, within the framework of the serial computation model (for the given class of computer systems) we are quickly reaching a state of saturation, where significant expenditures are needed to achieve relatively small increases in the processing speed of tasks. The question arises: What prospects can we count on in this area?

The Parallel Processing Model

This is the basis for a non-Neumann approach to computations. But we should not think that the parallel processing principle represents something new in computer technology. At the very dawn of computer technology Babbage established that a simultaneous processing of parts of a computation process, independent of one another, was possible. The parallel processing principle has been used to a greater or lesser extent even in electronic computers built on the basis of the Neumann computation model, in accumulators and control registers, beginning with bit organized information processing done when combining operations all the way to input/output and the parallel distribution of actual processing. But more serious work began only with the appearance of parallel computer systems. These are actually systems built up of computers standing in a mutual relationship to one another, capable of processing various parts of the same task simultaneously. Significant theoretical and applied results have been achieved in the area of the so-called functional parallel distribution operational mode, the essence of which is the parallel running of several parts of the computation algorithm on separate computer technology devices, with a parallel distribution to various depths--broken down by operations, instructions, commands, blocks, etc. A number of parallel computer systems have been designed or built to realize the functional parallel distribution operational mode, with appropriate parallel program support (software), which have very good performance in regard to a number of classes of tasks (for example, matrix tasks, form recognition, trace following and control tasks). For a number of tasks the functional parallel distribution operational mode realized in parallel computer systems has achieved a significant time saving in the course of processing. But a number of essential viewpoints must be watched out for when using the functional parallel distribution principle.

In the first place, it is necessary to develop special parallel computer systems and parallel software, which require a rather complex structure in the functional parallel distribution operational mode, and the functions connected with maintaining the functional parallel distribution operational mode in parallel computer systems make necessary significant time expenditures. As a result of this the average time saving for information processing done in the functional parallel distribution operational mode in parallel computer systems does not exceed 15-20 percent; the maximal time saving cannot be K-fold or more, where K is the number of processors performing parallel processing in the computer systems. In a number of cases the process of the parallel distribution of tasks represents a difficulty. Work is now being done in connection with functional parallel distribution, and we can count on substantial progress here. Questions are arising in connection with other operational modes and in connection with a detailed examination of the essence of parallel distribution, in regard to increasing the speed of information processing. The Technical Sciences State Committee of the Soviet Union has included this sphere of problems among the most important tasks of computer technology and programming in the period 1981-1985.

Homogeneous Structures

Within the framework of work connected with theoretical research on homogeneous structures (cell automats, iterative automats, cell structures, etc.) and parallel algorithms the Estonian section of the All Union State Technical Design Institute of the Central Statistics Office of the Soviet Union began, in March 1979, work connected with practical testing of a number of possible approaches to parallel information processing. Along this path we defined and examined the parallel information distribution operational mode, the essence of which is as follows.

Let us presume that we must solve a task M using information base B. Let us presume further that algorithm A which solves task M consists of K number of algorithms A' which handle B_i number of $(U_i\ B_i - B0\ (1_i - I, K)$ information bases without common parts and that on the basis of the results of running the A' algorithms the algorithm C giving the final result of task M can be depicted in the form of an algorithm linking these part algorithms. In this case--distributing information base B among K number of computers of a parallel computer system--we can process the task in parallel, with the aid of K number of processors, and in the following phase (in the serial or parallel mode) we can get the result of task M with the aid of algorithm C.

Let us illustrate what has been said with a simple example. Let us presume that the solution time for task M is a function of the quantity of input data n, in the form n^3. In this case, dividing the input data $X - (x_1, x_2, x_3..., x_n)$ into two parts and applying algorithm A to these parts simultaneously we get the total time for processing these parts, which will be $T_1 - n^3/8$, leaving us $T_2 - 7n^3/8$ time as compared to full processing of the data X. If we can now define the linking algorithm C so that its running time is less than T_2 tjem. as a whole, we get an increase in the processing speed for task M in comparison with a single computer.

At first glance it may appear that the class of tasks requiring efficient parallel information distribution is not too great. In reality, however, this is not so at all. After defining the parallel information distribution operational mode, we carried out a theoretical examination of efficient realization of such common procedures as external information ordering and search in this operational mode. The basis for the evaluation was a model of a formal parallel computer system. In the case of the ordering procedure we got a K-fold value for the time saving, where K is the number of processors. The procedure of searching for the necessary information is one of the most common and most important procedures in information processing; in essence it can be reduced to the following: How can one find with appropriate identification the data stored on external carriers? In many practical tasks the search requires the greatest time expenditure, so the minimalization of the time for this procedure is a very timely question.

We examined the problem of information search in connection with parallel information distribution and we obtained theoretical time saving values approaching $K + K^2$-fold for parallel search in parallel computer systems, depending on the organization of the data and the mode of using it. It was shown that in many cases the use of parallel information distribution in parallel computer systems makes possible significant time savings even for a search performed in distributed information bases which have serial organization. By virtue of the simpler organization of the base this can be a starting point for a significant reduction in the size of the information base, while ensuring satisfactory time characteristics in connection with handling it.

The approximate theoretical values obtained for search time in parallel computer systems on the basis of the parallel information distribution operational mode show that there is a need for a detailed examination of questions connected with efficient handling of distributed information bases, depending on the organization, structure and mode of use of the data bases. In the course of theoretical research on the parallel information distribution operational mode we obtained a number of interesting results in this regard which have practical significance. Naturally the efficiency of parallel information distribution is influenced by the extent of the information base to be processed, the complexity of the algorithm solving the task, as expressed in time expenditures, and the degree of interdependence among the sizes of the information base.

The theoretical research done in connection with the parallel information distribution operational mode shows that it is possible to use this operational mode to construct efficient information processing systems in an entire class of bulk information processing tasks, indeed to develop systems giving direct economic results. In processing systems giving direct economic results we developed systems based on parallel computer systems which, in contrast to processing done on separate computers, make possible not only substantial time savings but also cheaper processing.

An Experimental System

As an experimental test of the parallel information distribution operational mode and in order to develop sfotware supporting this operational mode in parallel computer systems we designed and built a parallel information processing system, the PIFR-1. We created the PIFR-1 on the basis of existing devices and software for ESZR [Uniform Computer Technology System] models with standard system development tools. This was done at the level of an applications program package expanding the OS ESZ possibilities suitable for parallel processing in homogeneous computer systems made up of ESZR models with channel-channel adapters and two-channel disks.

Operation of the PIFR-1 is based on the global-local control principle. In accordance with a formal model of homogeneous computer systems and a model of a parallel algorithm for the task (designed by a pre-computer) a concrete model of the computations was started on selected computers of the PIFR-1 system. Basic software of an individual computer controls the running of the programs For control purposes the pre-computer is connected with the processing process of the parallel algorithm, but only if situations arise in the individual computers which influence the course of the entire computational process. The global-local control principle not only made it necessary for the "nucleus" of the PIFR-1 to be present in every computer of the homogeneous computer systems but also ensured that the resident part of the system should not be proportionally too large (34 K), and made possible parallel organization of the execution of the PIFR-1, which significantly reduced the time expenditures connected with control functions in the homogeneous computer systems, improving the efficiency of the processing of parallel tasks under control of the PIFR-1.

The PIFR-1 consists of three chief parts: a parallel control program, a program taking care of information exchange between computers, and data structuring operations. Realization of programs for the PIFR-1 took place in the form of modules, with definite links between the modules. The modules are handled by the operating system in the multi-programming operational mode, which makes it possible to reduce waiting time to a minimum. Taking into consideration the purpose of the PIFR-1--as a test of the parallel information distribution operational mode--and the tools needed to develop and test an approximation suitable for developing the appropriate parallel software, we have begun development of a PIFR-2 package, which is a substantial expansion of the PIFR-1 from the viewpoint of both its functional possibilities and tools for communication with the user. This makes it possible to use the package in the course of developing information processing systems built on the basis of homogeneous computer systems made up of ESZR models. One goal of the work in connection the PIFR-2 package was to make the functioning of the package more efficient.

Experiences in the development of the PIFR-1 and PIFR-2 packages not only made it possible for us to test the parallel information distribution operational mode but also made possible the development of a unique position in regard to the organization of basic software for homogeneous computer systems, one oriented primarily to such a parallel distribution operational mode. Thus in the course of developing a new approach to information processing using the parallel information distribution operational mode we designed and realized two parallel information processing systems in homogeneous computer systems.

On the basis of a theoretical examination of several aspects of parallel information distribution and on the basis of practical tests of parallel information distribution using the PIFR-1 and PIFR-2 systems, the user must be provided with developed software which ensures realization of the parallel information distribution operational mode in homogeneous computer systems (while maintaining an efficient interface between the user and the possibilities offered by the parallel information distribution operational mode). Starting from this we tried to outline a structure for parallel software for homogeneous computer systems in which the essence of complete software for parallel control systems will occupy a special place.

The development of a parallel control system corresponding to the basic concept of the parallel information distribution operational mode can be regarded as the development of a new method for parallel information distribution supported by general use programming tools--increasing the speed and efficiency of information processing. We should note that the use of such an escalation method in developing parallel software for homogeneous computer systems made it possible for us to develop, interdependent with one another, a number of aspects of the concept of parallel information distribution and the supporting software, thus decreasing superfluous testing and errors--in addition to the entire theoretical examination of the parallel information distribution operational mode.

Thus far we have not succeeded in carrying out an extended examination of the parallel information distribution operational mode on the basis of parallel information processing systems. But the experimental results thus far are positive and promising. For example, external ordering experiments done in the parallel information distribution operational mode in a homogeneous computer system consisting of two computers showed that the times used to perform the task on a single ESZ 1033 computer (T_1) and in a two-computer homogeneous computer system based on the ESZ 1033 (T_2) are related to one another as follows: $T_1 - 1.8 T_2$. In this case it must be noted that the data to be ordered were placed on ESZ 5061 magnetic disks and if magnetic tapes had been used the difference would have been even more significant.

Even more time could be saved in parallel information processing systems by improving and making more efficient the system for information exchange. We are continuing our work in this direction. As I already mentioned above the functional distribution operational mode does not make possible, in bulk tasks, a time saving of K-fold or greater where K is the number of processors. In the case of parallel information distribution, however, such time savings can be achieved frequently, which could ensure the development of information processing systems giving direct economic results. An analysis of this problem has shown that in homogeneous computer systems consisting of K computers it is necessary to accelerate information processing more than K-fold in order to develop systems giving direct economic results.

What are those classes of tasks which should be considered primarily?

We carried out an analysis of book-keeping tasks for the purpose of selecting tasks which could be solved efficiently in the parallel information distribution operational mode. As compared to other classes of tasks these are considered the tasks which can be performed on computers with the worst degree of efficiency. As a result of the analysis we established that 80-85 percent of the tasks belonging to this class (as measured by time expenditures) consist of ordering and search operations. In addition, these tasks made possible distributed data handling at the level of initial data, intermediate data and output data alike (that is, putting the data in different computers).

Results

The approximate theoretical values obtained for the time for parallel search in parallel computer systems make it possible for us to speak of entirely realistic preconditions for the creation of high performance information search systems based on the parallel information distribution operational mode. This research is promising. A study of the development of efficient data base management systems based on use of the parallel information distribution operational mode is of interest also. Existing technical devices may limit the development of data base management systems using the new principle at acceptable costs for software development. This will make possible a significant reduction of all costs.

Data base management systems might be looked at in an entirely different way via the design of parallel type data base management systems. Structural problems for models corresponding to information search systems and data base management systems based on use of the parallel information distribution operational mode and an evaluation of the economic and operational efficiency of the models--from the viewpoint of designing them on the basis of industrial systems--have become important.

Another important problem area for practical utilization of the parallel information distribution operational mode is a subsequent determination of the class of tasks most appropriate from the viewpoint of realization in this operational mode and an expansion of the purely practical applications sphere for parallel information distribution for the purpose of a better understanding of the possibilities offered by it and making use of the results deriving from it.

A good bit of parallel developmental work is being done in the interest of more efficient use of parallel information distribution--improving the level of communication between the user and the parallel information processing system, a methodology ensuring parallel distribution of tasks, and making the work of programmers using the parallel information distribution operational mode in developmental work more efficient.

Finally it should be noted that our publication titled "Parallel Information Processing and Parallel Algorithms" provides detailed information on the parallel information distribution operational mode, the parallel software being developed to support it, problems connected with this and the long-range prospects.

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COMPUTER DEMONSTRATION AT MINISTRY OF INDUSTRY

Budapest SZAMITASTECHNIKA in Hungarian Oct 81 p 6

[Article by Dr Ivan Szabo: "An Unusual Demonstration"]

[Text] "Debates here have become noticeably more substantive and of higher quality.... Those who undertake to call attention to errors and deficiencies for the most part do not introduce what they have to say with honor laps, many fewer speak in the language of flowers, sincere opinion has success and credit...." (Erno Keseru, "Viewpoint," MAGYAR NEMZET, 13 Sep 81.)

It was my first visit to the Ministry of Industry. It was the first because previously it was the building of the Ministry of Metallurgy and the Machine Industry, which I have visited many times before.

The demonstration took place at the beginning of the work day. I arrived early and so was witness to something unaccustomed--work began on time. A few of the workers of the ministry, in order to get to their places on time, ran the last few meters so I had occasion to see a few successful "final spurts" like those of true athletes trying to be the first to cross the finish line. I hypothesize that this was more than some formal phenomenon. The first condition for getting work done--naturally not an exclusive one--is to "occupy" the place of work.

But what other unaccustomed things happened on this morning? On behalf of about 60 experts they had organized a demonstration which might have borne the title "Computer Graphics in Technical Design in Hungary," at the initiative of a state secretary and outstandingly supported by the Desk Computer Special Group of the NJSZT [Janos Neumann Society of Computer Technology].

In the future state secretary Dr Laszlo Kapolyi will handle the geographic assignment of activities or networks of activities for thh purpose of scheduling or placing investment programs, doing so as a very important activity giving precedence to computerization. This idea gave birth to this program, where we could become acquainted with the new expectations and the organizational and computer solution methods for them, previously formulated for the experts and leaders of the new ministry. This can be called something new despite the fact that systems already operate in our homeland the tools and solutions of which are similar to the expectations of the state secretary in connection with a delineation of investment programs, and similar to the system for keeping records of investments running in the computer center of the VEIKI [Electric Power Industry Research Institute]. The outlines of the solution have been worked out in connection with the data stored there also. But going beyond this we could also see special solutions for automated engineering design (AMT). The series of presentations and machine demonstrations given by the eight enterprises, each enterprise taking only a few minutes, reminded many of us of a well prepared artillery barrage. A barrage! Against whom and for what purpose? In my opinion it was in order to develop a new way of looking at the problem, in order to destroy the exclusiveness of the old batched view, for the purpose of ruffling its halo.

A large part of these tasks have already been to the wars and a number of small, medium and large computers with batch, on-line, real-time or time-sharing systems have been loaded with inadequate success. The results could be prepared only with impermissible delays, after a number of months, clumsily, without adequate vizualization, almost entirely ignoring the interactivity of task performance, uneconomically, inefficiently, without graphic documentation prepared synchronously which could be reproduced, etc. Restarting programs at will or reprocessing them took much time and still does because lacking adequate tools and an appropriate view it is not possible to change the insupportable situation which means that instead of (or lacking) local remote data processing systems, decentralized, interactive local or so-called endpoint-oriented ad hoc systems the jobs are "run" centrally, more correctly they "trudge" on our larger systems, unnecessarily burdening capacity which could be turned to other tasks--such as really large machine dual processor tasks.

What tasks? This is the other important idea which some of us have formulated already in our heads. If a large part of the tasks presently run could be "taken off" the larger machines--and, naturally, if there was a virtually unlimited availability of special purpose devices--then perhaps the "large machine" tasks could be reformulated and we might develop new, quality linkage systems between the computer centers and the places of work supported by computers. Perhaps we could move away from our generally outmoded, dusty solutions, whether the tools used are the best ESZR [Uniform Computer Technology System] or IBM machines. In my opinion we would soon find that the enterprises or users possessing computer technology information and outgrowing the frameworks of batched processing would reformulate their developmental ideas and these would then be permeated by a determination of a polarized demand and need.

A dream appeared even during the demonstration: How much simpler it would be to get a shipment to the proper place with a small cart, with suitable capacity and maneuverability, say to the shelf of a warehouse, than with a Boeing or Ilyushin airplane. And it would surely succeed, while this success is doubtful with a larger tool more suitable for different tasks. There was no need even to think through the economic and other effects and consequences.

It is not a new idea but rather a fundamental thesis of our profession that we should order the tool to fit the task and not vice versa. Has the time finally come when we will not be shooting sparrows with a cannon?

During the break someone said that 60-80 percent of the large enterprise tasks now on the computer at their place (he was talking about a concrete enterprise) could be "taken off" the computer now in use--which, in any case, is already 7 years old, and "creaking and rusty." And if they could get for this purpose in hard currency one fifth of the forint sum intended for a large computer (or if a socialist device of equal value could be put in operation) and if the embargo limit were no impediment (in my opinion devices below the embargo level would be perfectly adequate in this case!) then what it would mean--and I don't discount it--in the life of the enterprise, in the development of their marketing possiblities, to use new computer technology devices and methods as a real tool. (It serves to excuse the users that use of domestic and socialist devices is limited not by a lack of demand but rather by the inadequate pace of development!)

What were those institutions which really used these devices finally as a tool, or which demonstrated their solutions?

The Ganz Electric Works: in the area of manufacturing parts by metal cutting, in putting together bids for electric trains, etc.;

The Ganz-Mavag Locomotive, Car and Machine Factory: in designing locomotives and motor trains, in designing pumps and turbines, in preparing bid documentation, etc.;

The Hungarian Hydrocarbon Industry Research and Development Institute: to evaluate drilling technology, geophysical and laboratory measurements, to plan operations, to model gas networks, to prepare large computer jobs and for algorithm research;

The Signal Technology Industry Research Institute: to design hybrid circuits, for measurement control and swift testing of large series circuits;

The Hungarian State Lorand Eotvos Geophysical Institute (ELGI) and the CORTEX Software Development PJT [Civil Law Association]: to develop a small computer terrain research guidance system, to prepare on the spot decisions for drilling activity, and to provide colored, graphic, three dimension depictions of coal fields and bauxite deposits;

The Survey Institute: to track artificial satellites, for general geodetic net calculations and computer depiction;

The Oil Plan: to calculate thermodynamic dimensions for petroleum industry distillation columns, to depict various physical conditions and geographic planning of pipelines; and

The Auto Industry Research Institute: to calculate optimal dimensions of large capacity internal combustion engines and for automatic testing.

The participants emphasized the practical utility of three dimensional function depicting software developed domestically (by ELGI and CORTEX) or by factories in the solution of tasks arising in various fields (technical, investment, engineering, etc.).

And what was unusual still?

They put together, in 10 minutes, and 10 minutes before the beginning of the demonstration, an HP 9845 C deck computer, which "cooperated" in this demonstration, with 200 K bytes of internal storage and a color graphic screen.

The speakers brought in their vest pockets programs and user program packages stored on minicassettes.

In 10-15 minutes we were told how the conditions for a 15 million dollar deal were fulfilled on a small computer and in the next 10 minutes we heard about more millions of dollars and tens and hundreds of millions of forints.

Would the whole thing be so simple?

If we think, select and decide well, if we decide in time, and if this is supported appropriately by higher echelons with the right of decision, then the answer, in our microprocessor world with a new view, is YES!

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DOMESTIC SMALL COMPUTER PRODUCTION

Budapest SZAMITASTECHNIKA in Hungarian Oct 81 pp 7-8

[Article by Karoly Stuka: "Domestic Manufacture and Use of Small Computers"]

[Text] Development of small computers began in our homeland in the second half of the 1960's in a number of institutions and collectives working largely independently from one another. It is not certain that the choice was deliberate, but it proved even on a world scale that the development of small machines was the most successful area. This may be thanks to the fact that the tools at our disposal made the development of computers of this size possible.

Essentially two successful and viable lines developed out of the many beginnings. We are calling one the PDP line and the other the CII line. In addition there are machine families which still exist and are developing (for example, the Vilati small computers). But despite their merits I do not regard these as determining factors in the development of domestic small computer manufacture and use.

The PDP line started at the KFKI [Central Physics Research Institute] with the development of members of the TPA [Stored Program Data Processing] computer family. The original meaning of TPA was "stored program analyser." In the course of developing and producing nuclear instruments--for example, manufacture of multichannel spectral analysers--the KFKI reached the level where it was able to develop universal small computers and manufacture them in small series. The first TPA computers, which in their architecture were adapted to the PDP-8 family, were followed by a TPA which had integrated circuits and then by the TPA/L and TPA-70 small computers, which used the same technological base but were no longer compatible with the PDP. (The TPA-70's are manufactured even today.")

The CII line is the result of another development. Its basis was the purchase of a CII-10010 computer license from the French CII firm. Originally the 10010 computer was a small computer designed for process control but it was used and is still used today for engineering calculations by a few domestic planning institutes.

The work connected with acceptance of the license was done by the SZKI [Computer Technology Coordination Institute] but manufacture was started by Videoton under the name VT-1010B. This was followed by the purchase (from the same firm) of the Mitra-15 license and, as a result of this, by the development and manufacture of the ESZ 1010 computer as part of the ESZR [Uniform Computer Technology System] cooperation. We can say with good reason that the purchase of this license created the foundation for the domestic computer technology industry. The ESZ 1010, of which the VT [Videoton] manufactured several hundred configurations, was a very successful computer (a few even appeared under the name ESZ 1012, with an expanded instruction system). The great majority of the machines were exported. It may be that domestic users do not entirely share the opinion of foreigners but foreign users give it an unambiguously positive evaluation and, in this case, this is the final word. The Soviet Union is the biggest importer; VT computers are standard equipment, for example, in the dispatcher system of the electric power network covering the entire Soviet Union, for automatic control of oil and gas pipelines, in guidance systems for oil extraction, and in control systems for rail marshalling yards. Only well equipped, reliable computers at a high technical level can be used in such places--the VT machines meet these conditions. To ensure this, naturally, Videoton maintains a service center in Moscow with appropriate personnel and equipment.

The Present

Two types of computer technology manufacture exist in Hungary. On first hearing it appears that this should be condemned but in my opinion this is not so. The two types of manufacture differ radically from one another. The products of Videoton are primarily for export, primarily to the Soviet Union. Equipment produced economically in large series for large users is shipped in a few versions, but a small quantity also satisfies special and domestic needs.

Domestic needs are supplied primarily by computer technology manufacture taking place in the KFKI, where series size is sometimes 10 units while the institute is prepared to provide complete systems for needs moving over an extraordinarily broad scale. I do not say that this situation is the best but at least it is understandable. Especially if we consider a few peculiarities of our economic regulator system.

At present also the two developmental trends continue based on the two lines.

In the PDP line the KFKI has created the TPA 1140 computer related to the PDP-11/40 computer family. The present task is to create an advanced TPA 1140 model which extend "upward" the possibilities of the preceding machine. The EMU-11 minicomputer represents an extension of the 1140 "downward."

In the CII line, with the purchase of a new license, we have the ESZ 1010M and ESZ 1011 computers, which have a better price/performance relationship and offer a good bit greater performance than the ESZ 1010. Foreign demand in connection with the new machines is similar to the preceding period, perhaps because they have maintained the fullest possible compatibility with the ESZ 1010.

An interesting development at Videoton is the recent appearance of the SZM-52 computer, which can operate in both the PDP-11 and ESZ 1011 mode. In a number of applications it could be useful to realize with one machine the existing network operation based on the ESZ 1011 while using the existing technical calculations programs for the PDP machines in the local mode.

It is probable that the appearance of a third line will be a determining factor. We might call this a line of ESZR compatible small and medium machines. The expression ESZR should be made more precise because the ESZ 1010 and the ESZ 1011 also are members of the ESZR, but they are not compatible with it. The new line is represented by the ESZ 1015 which belongs in the second series of the ESZR. It is expected that five or six units will be completed this year and manufacture is expected to start in a series of some tens of units. A larger series run will depend on the export possibilities, which will be clarified after 1984. By then the development of the advanced ESZ 1016 and ESZ 1017 models will probably be completed.

The picture would not be complete if we did not mention the microcomputer trend. But in this case we cannot use the expression "line," the situation is better expressed by "tangle"!

An immense number of microcomputers have been developed recently, about 100. The most significant are the VT20, the MO5X computer of the SZKI, the EMG-666 and 777, the MMT system created at the BME [Budapest Technical University], the MGP-80 computer of Textile Industry Research and many others.

The Applications Situation

The situation was very simple in connection with use-everyone used what he could, what he could get. The number of types of small machines brought into our homeland or created here is over fifty. The present situation is essentially defined by the KFKI. An ever increasing number of domestic users work with the various types of KFKI machines, and demand considerably exceeds the manufacturing possibilities of the institute. Today the ratio of domestic sales by Videoton is increasing as compared to earlier--primarily due to the spread of the VT20 systems.

The domestic applications picture would not be complete without the imported small computers. The PDP line includes the SZM-4 machines which can be imported from socialist countries and which belong to the MSZR [Minicomputer System]. Import of them began in 1980; a considerable number of machines arrived this year from the Soviet Union and purchases are expected from Czechoslovakia and possibly Bulgaria. The Elektronika-100 computers which can be acquired from the Soviet Union are compatible with these at the program level. In the years ahead these import machines may be the determining factor from the viewpoint of domestic use.

I do not mention the capitalist import machines because neither the economic nor the political situation make it probable that these will be available in larger numbers.

In the area of microcomputer applications the already colorful domestic palette will probably be varied even more by socialist import equipment, primarily by Robotron, which is conducting intensive market activity, and by Polish microcomputers, which have favorable features on the basis of samples but which can be handled only with reservations for well known reasons.

What Next?

We now arrive at what is perhaps the most sensitive point of the article. In what follows I have reviewed briefly the advantages and disadvantages (plus and minus) of the three existing lines mentioned.

The Line of ESZR Small and Medium Machines

Plus: Every advantage of ESZR cooperation can be used, there is a complete supply of peripherals and software.

Plus: It can be hypothesized that after 1985 there will be export market demand.

Minus: Domestic manufacturing traditions are completely lacking.

Minus: The export market does not stand out so strikingly from the other ESZR machines, as in the case of the ESZ 1010 and ESZ 1011.

The CII Line

Plus: The domestic manufacturing culture and tradition are significant.

Plus: The socialist export market is well established.

Plus: Demand at present is very strong on the socialist export market.

Minus: Thus far, basically, development has relied on license purchases.

Minus: At present one cannot forsee the prospects for sale of licenses.

Minus: An adequate domestic applications and reference background does not exist behind manufacture.

The PDP Line

Plus: There is significant domestic applications experience.

Plus: A domestic developmental background is ensured.

Plus: This continues to be one of the world's leading small computer trends.

Minus: Domestic experience with mass manufacture is lacking.

Minus: For the time being uniform technical policy coordination is weaker in MSZR cooperation than it is in the ESZR.

Minus: Basically the line depends on following prototypes, which involves risks.

As can be seen, the positive and negative aspects are about equal for all three lines. No one of the three is unambiguously better than the other two so on the basis of such a survey one cannot decide which to follow.

But a decision is needed.

The development of small computers, or the market, will not wait until we at home decide which trend to follow, and if we continue to be uncertain "the train will leave without us."

The resources at our disposal (on a national level) are not sufficient to follow all three trends. We face a forced decision at a high level.

In a forced situation a decision must be propitious rather than optimal, because it is very difficult to say what is optimal. Of the influencing factors the market policy factors will have the chief effect. At present the quality of Hungarian small computers and peripherals is the best on the socialist export market--it would be folly to abandon these market positions. The dark side is that domestic industry achieved this by making use of a quite high although not excessive capitalist productive import.

It seems a just requirement for the computer technology industry to bring the productive import needed for production at least into balance with its capitalist export. Opposed to this is the fact that at the level of the national economy it would be much more favorable to increase the export efficiency of other branches (for example, the food industry) by making use of computer technology equipment, because this would "bring in" many times over the foreign exchange needed for productive import. (This question requires further analysis.)

In evaluating the export markets the capacity of domestic industry is very significant also. The series size which appears the maximum attainable here would be so insignificant in the Soviet Union that it would not play a determining role there. We might seek a line to follow outside of the above three. Arguing against this is the fact that at present domestic software development capacity is not sufficient for the introduction of an independent, entirely new line. This would require significant concentration--and just the opposite can be experienced.

The only positive factor is that we have the developmental reserves for all three lines and it appears possible to start immediately a well paced development of any of them, after a decision is made.

It may appear that I have not mentioned the needs of domestic users among the determining factors. It is unfortunate that the level of domestic use does not reach a level, either quantitatively or qualitatively, to make it a determining factor for domestic industry. Domestic small computer applications still bear the signs of contingency, developments are scattered and take place independently of one another. Only in recent years have they started a few more comprehensive projects which may provide a guide for the domestic market in the next plan period.

Paths For Microcomputer Development

As I have mentioned already, one can best characterize the domestic development of microcomputers thus far with the word "anarchy." Central influence and coordination have been completely lacking, which may not be bad only from the viewpoint that trends which may become determining ones developed very freely.

A certain degree of concentration of development is indispensable in the future. Naturally I consider unimaginable any ban or central regulation. Certain preferences should be used to bring things together. This might be directed primarily at the following: united developmental systems; concentrated developmental capacity; a narrower but guaranteed accessible element base; and providing system elements made with mass manufacture.

The appearance of microcomputers means that the relatively well established boundaries of the computer technology industry have been washed away and the branch is becoming integrated with a number of other areas, for example with medical instrument manufacture, automatics, robot technology, telecommunications and signal technology, the instrument industry and there is no need to continue the list. This requires a serious rethinking and reformulation of technical development and industrial policy.

One element of central influence will be a research and development target program at the ministerial level, which is now starting under the title "Research and Development for Microcomputers and Their Applications Systems." The program prescribes relatively extensive central support, but much more significant are those enterprise assets which can be put in the service of a common goal in this way.

The developmental program prescribes the realization of certain goals in three categories--general use microprogrammed control equipment, microcomputers for technological process control and microcomputers for computer technology tasks. The most important goals are:

--Providing microcomputers, microcontrollers and microperipherals accessible in the OEM way for those putting together user systems;

--The possibility of access to developmental systems in commercial trade (it is frequently the case at present that a developmental system is developed for the first time in order to create a microcomputer system);

--Creating programming systems, languages and program libraries for microcomputers (in many places today program development for microcomputers takes place with ancient methods, in machine code or with primitive assemblers, at a very low level of efficiency);

--Developing applications model and reference systems (there is a very great need for these because microcomputers are being used by a much broader camp of users, less skilled from the viewpoint of computer technology, than used earlier devices);

--The above justifies a vigorous development of information, advice and education services; and

--The efficiency of developmental work must be increased by unification, standardization and specialization.

We hope that realization of these goals will aid the efficiency of developmental work, which is now scattered and uncoordinated, and substantially reduce the price of systems.

The organization of closer cooperation among CEMA countries in the area of microcomputers has been more vigorous recently. From the viewpoint of development this will certainly be of the same significance as it was when the ESZR cooperation began.

The Future of Use

As I mentioned already, in the area of applications we have not yet attained such success as in the area of developing and manufacturing small computers. The leap in the number of computers which is expected will surely lead to a qualitative change in this area also.

It is absolutely necessary that every aid necessary for use should be available to the users as a service condition. If there are very many users it cannot be imagined that the users will create everywhere their own service and software capacity.

Our present enterprise structure is not too suitable for such services. Various economic regulators must be used to help make the enterprises and computer technology institutions better interested in offering various services, so that they cannot make a living by selling machine time or delivering "naked" machines.

It might also be useful to create new organizational categories of users. I am not necessarily thinking here of the mushrooming PJT's [civil law associations], which rather remind one of a gold rush, although these organizational forms also will have a certain role in resolving present tensions. The developmental (engineering) enterprises and economic associations will probably be more stable institutions on which to rely when providing complex computer technology services.

We consider the creation of model systems to be very important in the area of applications development. These are already useful for concrete users and they offer a way for the developmental collective to master the special tricks of setting up systems provided and they can perform certain experiments in the area of developing optimal hardware and software configurations and working out applications methodologies. The central support provided to model systems reduces the risk accompanying such experiments.

In addition to the model systems for process control and engineering design, which can be regarded as classic, we consider it very important to create in the coming period enterprise guidance model systems working in the minicomputer distributed, on-line mode.

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RESEARCH IN PETROLEUM, NATURAL GAS VIEWED

Budapest NEPSZABADSAG in Hungarian 28 Jan 82, p 5

[Article by Gabor Pal Peto: "Visit in the Hungarian Hydrocarbon Research and Development Institute"]

[Text] In Szazhalombatta, on the premises of the Duna Petroleum Industry Company, the visitor's attention is captured by four long, narrow single-level buildings: the Hungarian Hydrocarbon Research and Development Institute (SZKFI) is situated here. The sign on the top of the first building is in many ways inaccurate, as told in the introduction by Sandor Doleschall, director.

Experimental Model Institute

--This is only the center of SZKFI, in addition to this facility, they have branches operating in 11 locations: in Budapest (several of them) Peterfurdo, Nagykanizsa, Szolnok, Szeged, Tatabanya, Miskolc. The Zalaegerszeg Petroleum Museum also belongs to us. This is explained by the creation of our institute. SZKFI was created 2 years ago by the National Petroleum and Natural Gas Trust from three former institutes. Among these: the High-Pressure Experimental Institute (NAKI) established for the hydrocrack research of the late Joseph Varsa, academician, was a research institute; the National Petroleum and Natural Gas Industry Research Laboratory (OGIL) was a company; finally, the Natural Gas Technology Research and Testing Station (KGVA) was one of the plants of OKGT. The regional research stations of these three institutes were also turned over to us.

Director Doleschall finds it more important that as far as its name is concerned the research and development institute is a company. It is the first, almost experimental, example of a new type of institution; a research and development company, which exists based on commissions from the industry, research performed to satisfy company requirements and related activities, such as procedure, device and instrument design. It has 920 employees, one-third of these have university degrees, but only a portion of them are designated as scientists; the designation was contingent on rather stringent requirements, e.g., language skills (skills, not examination!) and the acquisition of this designation motivates the young colleagues. The director finds the number of 38 researchers with doctorate degrees insufficient (although, SZKFI also employs a doctor of sciences and 16 graduate-level researchers): they strive for the type of achievements that beside being of primary significance for industry and the economy are also scientifically recognized.

--We measured up the accomplishments of our institute during the past 5 years and those of its legal predecessors and found that approximately 70-75 percent of our results were introduced by industry in a year, and approximately 85-90 percent in 3 years. This may appear nice--in my opinion too nice--, since the remaining 10 percent is too low for us to be able to maintain the same ratio. Because in addition to the necessary failures, this portion includes those long-term tasks which will not come to fruition for several years.

Underground

Instead of discussing the ambitiously but carefully planned future tasks, I attempt to discuss with the directors of the four branches some typical examples of current accomplishments.

Janos Kokai, director of the mining branch employing one-third of the personnel of the institute, mentioned that their diversified activities are closely connected to the long-range plans of national petroleum exploitation:

--The laboratory examinations of rock samples taken from domestic hydrocarbon research drilling are done in the institute. These are extremely important for hydrocarbon research, the determination of hydrocarbon assets of already discovered deposits and for the preparation of exploitative plans securing a large final return.

We developed computer programs in our institute to model processes taking place in certain petroleum and natural gas deposits. These allow to judge how pressure and water afterflow (as a nautral squeezing power) will vary in deposits found in porous or fissures rock formations situated several hundreds or thousands of meters underground.

As an example, let me mention that we expect a 43-47 percent final retrieval with the exploitation conducted based on our plans at the most important domestic deposit (in Algyo); this has already been confirmed by the results so far. The economic significance of this can only be seen if we know that, according to the world average, only 25-30 percent of the initial petroleum reserves can be exploited; the rest remains underground as a result of complicated physical and chemical forces which act against exploitation and which dominate the petroleum-rich rocks.

In addition to this, we are involved in many other tasks connected with hydrocarbon exploitation. We are conducting organic chemistry examinations to become more familiar with the perspectives of national hydrocarbon exploration. The so-called secondary and tertiary procedures serve to further reduce the quantity of petroleum left in the deposits: research of carbondioxide, underground burning and future chemical (micellar) methods.

I have only touched on a few areas of activity and said nothing about the geophysical, sludge drilling and cement research in our branch, whose results will all be used by industry.

The success of our activity is greatly enhanced by the fact that we regularly discuss our research results with technical leaders of IKGT and experts of the petroleum producing companies and agree on the steps necessary for industrial implementation.

The End Is Not a Report

Following the conversation with Janos Kokai, let us trace the path of petroleum and natural gas brought to the surface; perhaps in an unusual manner, let us begin with natural gas.

Istvan Hajdu, director of the natural gas industry branch of the SZKFI, reminds us of the fact that in the past two decades the natural gas consumption in Hungary has increased 30 times; today almost one million households use gas in about 150 cities and communities, and, in addition to this, 2 million and 2 hundred thousand households use propane-butane gas tanks; i.e., 75 percent of all Hungarian households are supplied with gas.

Research connected to the extension of natural gas use is diversified. For instance, gas enters homes at a very low pressure. This is something left over from the time when gas was used for lighting and corresponds to the state of the art at that time. Today, however, this is not only unnecessary but is also disadvantageous. The method has been developed which does not interrupt the medium-pressure gas flow at the outside walls of homes but allows it to continue into the home as well. This way, gas can be more efficiently burned, and the large and thick-walled ugly pipes become unnecessary; a sufficient amount of gas can be supplied through narrow pipes and the others can be hidden. This system was tested in Ingolstadt, in the Federal Republic of Germany, and achieved a savings of DM 900 per household during installation. In Hungary, too, after overcoming many difficulties, the new natural gas-supply design is gaining ground.

Another interesting research task is the modernization of propane-butane (PB) gas use. To extend its use from cooking to hotwater and home heating, first we must produce and authorize tanks larger than the well-known gas tanks. This was finally accomplished as a result of several years effort. The other problem is that butane gas has a lower gas pressure and, as a result, does not come out of the tank in the winter or in cold locations; it cannot be used and is lost. In certain situations, it would be beneficial to use pure propane gas. But what about butane gas then? In cooperation with the Ganz Electrical Works the researchers developed a burner which could also burn liquid gas, i.e., even pure butane. The utilization possibilities of national natural gas occurrences contains neutral (inert), nonburning gases--nitrogen, carbondioxide--are also being studied. But the scope of their activities involves even gas equipment, for whose inspection they are responsible, thus observations made find their way back to the manufacturers. Or they study gas flow dynamics--with computer simulation--which is important during the installation of new consumers.

Petroleum research is handled by two branches of SZKFI: petroleum processing, headed by Gyula Gati and technical and technological research, headed by Lajos Zalka.

Describing the diversified research activities, Lajos Zalka is proudest of two things: one of them is very small and the other, very large. The small one: the experimental laboratory reactor system which won an award several years ago at the Budapest International Fair. This equipment was originally developed to support their own research goals; it allows them to simulate in 100-milliliter volume the catalytic processes taking place in the gaseous and liquid states. Ultimately, there was so much demand for this equipment both domestically and abroad that they were unable to produce it in sufficient quantities; so production rights were turned over to the FOK-GYEM cooperative which exports 20-25 units yearly of the various models, while they are devoting their attention to further development. The very large one: two partial plants built in Peterfurdo in collaboration with the Danube Petroleum Industry Company. Based on individual initiative and commissioned by Fuzfo Nitrochemistry, they developed the production technology for a compound (intermediary) necessary for the production of two insecticides.

--In connection with the conflicting results down between the research institute and industry, my opinion is that the obstacles are caused by increased dimensions --emphasized Lajos Zalka.

--In my opinion, the only possible way is to entrust the research institute with the establishment of the experimental partial plant. In this particular case, with the consent and support of our superiors, we could build the two semiplants --4000-ton with an annual or 1000-ton capacity per year. We took full responsibility for them from design to implementation; this was part of the reason why we managed to complete them in 2.5 years, which is a national record. After the successful completion of the experiment--during which we delivered in significant quantities and flawless products to industry--we turned over the plants to the Danube Petroleum Enterprise, and, at the same time, started the development of new procedures.

But maybe this is not the only possible way to development--adds Lajos Zalka later. A plant is now under construction in Fuzfo, using our achievements and our expertise. From our own experience, I can say that a research project that ends with a report is in most cases a failure.

Oil Change Every 12000 Kilometers

The branch headed by Gyula Gati is involved with petroleum processing, production and product development. Lubricating oils, machine grease, fuel, pharmaceutical and insecticide intermediaries, special materials, e.g., temporary and permanent anticorrosion materials (for car frames): this is an extremely diversified branch.

--Gyula Gati mentions that presently production of fuels is taking place in several refineries, using various technologies and with the production of various products. Coordinating this complicated system to make it optimal for the country is nearly impossible. We developed a computer model for it, commissioned by OKGT, and, according to estimates, this optimized management system results to gain several hundred million forints extra profit.

In an industry of this size, minor variations can produce enormous results: e.g., in gasoline reforming--in whose research we have been involved for 15 years--even one percent extra extract means 10 million forints.

Presently we are doing research for a 1-million-ton cracking plant being built by DKV. The plant--in which we crack heating oil molecules (to gasoline and gas oil) knows many "tricks," e.g., the utilization of the side products created, processing of the petrochemical products. We are developing original procedures using laboratory equipment for these and the production of insecticide and pharmaceutical base materials to induce export to capitalist countries. To automate them, we are beginning to use--currently only in-house--microprocessing and computerization. In the designing of the plants based on our new procedures, we are collaborating with the Petroleum and Gas Industry Planning Enterprises.

Since we live in a car-oriented country, fuel and lubricants are of interest to many of us. In closing let me mention the following: our experiments have determined that using domestically-developed lubricationg oil, the oil-change cycle can be increased to 12,000 kilometers; trucks went for 100,000 kilometers without an oil change. The significance of this for the national economy and private automobiles can be easily understood.

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Last year, the Ministry Council put great emphasis on the significance of research and development companies in dealing with the development of the scientific-research institute network. This is another reason why the activity of this institute deserves attention.

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SCIENTIFIC PROBLEMS VIS-A-VIS ECONOMIC CRISIS ASSESSED

Warsaw TRYBUNA LUDU in Polish 15 Jan 82 p 4

[Article by Zdzislaw Kaczmarek, scientific secretary, Polish Academy of Sciences: "Science During the Period of Overcoming the Crisis; Problems and Discussions"; passages enclosed in slantlines printed in boldface]

> [Text] Polish science has found itself in a distressing situation, one which demands that many viewpoints be revaluated and that a new, constructive program be prepared. The prolonged socioeconomic crisis which is afflicting our country has left its mark on it and the need to solve other burning problems does not permit the political authorities to treat science as a priority area at this time. It will be necessary to limit the scope of research and to adapt its subject matter to the most critical social needs. It will take many years of intensive work to make up the backwardnesses that already exist and that continue to arise. At the same time, in view of the difficult situation of the State and the economy, the scientific community faces new obligations and increased responsibility for Poland's future.

The imposition of martial law has halted the rapidly growing process of the disintegration of the State and the economy. However, the restrictions that result from martial law are burdensome for creative-type communities and cause serious controversies. The possible prolongation of the period of isolation of Polish science, and particularly difficulties in taking advantage of international exchange of scientific-engineering ideas, may have negative consequences. There are rumors that in some countries boycotts are being organized against cooperation with Polish colleges and institutes.

Superficial Generalizations

These are objective circumstances and they cannot be fully solved in the immediate future. However, the subjective preconditions for the functioning of Polish science, arising from the ambiguity-tinged relations in the triangle: society, State authorities, scientific community--arouse just as much distress. It must be said candidly that we are not at all without fault here. During the decade of the 1970's, a representative portion of the scientific community sanctioned by its authority the faulty economic decisions that brought Poland to the brink of catastrophe. It is not surprising, therefore, that a part of society and large circles in the State administration show a lack of confidence in scientists.

The August events released justifiably critical reactions in the intellectual circles. But they were accompanied by overly histerical manifestations of expiation as well as by attacks by the political opponents of socialism on all of the economic, scientific and cultural achievements of the postwar period. Cries were heard, with no factual basis, about the universal crisis of our social system, including also Polish science. All of this has an adverse affect on reinforcing the credibility of science and its representatives in the eyes of the public.

On the other hand, however, the intellectual circles are the object of superficial generalizations. The linkage of the extremal political tendencies among "Solidarity" activists with the attitudes of some of the workers in science and culture who oppose socialism, has, here and there, created a tendency to identify all of the creative-type intelligentsia with the antisocialist ideological current. This is a one-sided and false picture. During the entire post-August period, a considerable part of the scientific community spoke out in favor of the socialist path for Poland's development and furthermore, through a system of consultation and implementation of research tasks, wanted to serve the constructive positions and actions which would assist in finding a way out of the crisis. However, these activities were not properly displayed and their effectiveness was restricted by political tensions.

The Search for Solutions

Frustration in the scientific community, lack of public confidence, and a resentful, in large part, power apparatus--this was the configuration that, indeed, augured the worst. /The primary need right now is to conquer the prejudices that have arisen, and to place mutual obligations on the parties involved--obligations which arise from the obvious necessity to include all of the nation's creative forces which favor socialism in the activities which will assist in overcoming the critical events./

It is the obligation of our community above all to shape the attitudes of rational thought and to search for solutions which will be particularly useful in:

/--reconstructing social attitudes, and principally increasing the influence and responsibility of the young generation of Poles for the fate of the fatherland;

--changing the economic mechanisms and methods of managing the State and social life;

--adapting the structure of the economy and technological solutions to the raw-materials' capability and cadre potential of the country./

The participation of science in preparing economic reform and in developing forms of collective life should assist in the practical accomplishment of these goals. National agreement in Poland must be based on scientific principles of the organization of social life, free of fortuity and all kinds of voluntarism.

/Research problems of the 1980's must be adapted to the above-mentioned social goals. This will require a deep reorientation of the activities of many scientific groups,/ and particularly those that were directed at solving problems that coincided with the erroneous economic concepts of the past decade. The problem of correctly choosing the subjects of research was always one of the critical points of our scientific policy. Solutions here must come from the cooperation of the scientific community with the representatives of industry and they should be based on the long-range program for the country's socioeconomic development.

During the next few months a review should be made of the centrally controlled research programs and their number and scope should be limited to the sizes that are realistically justified by the need for increased coordination, based on objective financing.

/In expanding scientific activity for practical needs, we must observe the necessity for conducting basic research, whose results not only constitute a lasting contribution to our culture and raise Poland's prestige in the world, but also make it possible to create original theories and methods indispensable for future applications./ Based on international experience, we should require that at least one-sixth of the funds and the cadre potential are committed to basic fields of research. In this way we will show proof that we are thinking responsibly about the future.

No one in our country doubts today that the key to Poland's future rests in the hands of the working class. I believe that the party to which I belong has not been able to find effective ways of bringing creative intelligence closer to the workforces of the large, industrial plants, leaving this area of activity to our political opponents. It is obvious that /the scientific community should support the working class in its striving to improve the efficiency of the economy, for social justice, and for improvement in the socialist relations of production./ In performing a service role to society, science must, at the same time, avoid the appearance of servility towards the authorities; it cannot be patronizing, as has happened frequently in the past.

At this point some thoughts occur on the state of the social sciences. Because I am engaged in another field of research, I can evaluate its state solely from the position of an outside observer. But it seems that in considering the critical events in our science they should be perceived precisely in this field--primarily in view of the lack of a close connection between the development of social sciences with the actual needs of the shaping of the socialist sociopolitical system. Errors in the party's scientific policy, which were of long standing and had various roots, and the attitude of part of the party circles of the social sciences, were decisive here. Preparation of a detailed analysis of the situation in the social sciences and a program for overcoming these deficiencies, is indispensable.

Making Use of the Potential

/In order for Polish science to develop and properly accomplish the tasks which it faces, specific conditions must be fulfilled. It is the duty of the State authorities to ensure these conditions, within a reasonably justified range, even in times of economic crisis./ For the crisis cannot be overcome unless the scientific potential is properly utilized. The most important problems include:

/ 1. Maintaining for the next two to four years the present technical level of the research centers by ensuring them the minimum funds for renovating scientific apparatus and keeping it in operation; after this period, a fundamental modernization of the research facilities will be indispensable, so as to at least in selected fields adapt them to the average world level.

2. Ensuring the highest priority for a regular flow to Poland of information on world scientific achievements, primarily in the form of importation of periodicals and books.

3. Ensuring a lasting perspective for the operation of valuable research groups, creating a guarantee for continuity of research, protection against the negative effects of periodic fluctuations of the economic situation, and support for the development of distinguished Polish scientific schools--irrespective of whether they are involved in basic or applied research.

4. In view of the prospects of a reduction in funds for research by the industrial enterprises operating in the new economic system, increasing, during the interim period, the share of the State budget for financing work that advances scientific-engineering progress in the national economy.

5. Maintaining by Poland scientific cooperation with leading research centers in socialist and capitalist countries and with unions and scientific societies; the organization of boycotts of cooperation with Polish science, often inspired by Polish emigration circles, should be resisted.

6. Developing self-governing forms of organizing scientific life, shaped by many years of tradition, and giving them broader powers in matters of research initiatives, selection of methods, assessment of value and integrity of results, and in the field of training scientific cadres, while at the same time guaranteeing the State's influence on the implementation of social goals of scientific policy.

The primary goal of these actions is to bring about a state in which the important, certainly, intellectual potential of Polish science will be properly utilized./ In past practice this was not possible due to the lack of a long-range coupling of economic intentions and research programs, and a simultaneous lack of motivation for cooperation of scientific circles with industrial organizations. The lack of efficiency in scientific facilities was caused also by the serious technical backwardness of many research shops.

I repeat again that the thesis, promoted during the post-August period, that there is a general crisis in Polish science, does not withstand criticism in confrontation with the actual facts. A number of fields have expanded and obtained meaningful results, which have also been recognized outside the borders of our country. Today it is most important that we use these achievements to make it easier for us to extricate ourselves from Poland's critical sociopolitical situation.

The Role of the Polish Academy of Sciences

In conclusion I wish to make some comments regarding the Polish Academy of Sciences. The controversies surrounding its role in Polish science have persisted as long as the Academy exists in its present form. In any case, they have deepened during the last several months. We have even heard from those who would like to see the Polish Academy of Sciences as a platform for political discussion between the intellectual communities and the State authorities, giving its actual scientific functions a secondary importance. We cannot agree with such a position.

The acceptance, during the First Congress of Polish Sciences, of a three-element model of the Polish Academy of Sciences: a self-governing society of scholars, a State center for basic research, and one of the organs of the State's scientific policy, provoked a great deal of resistance, especially among the scientific administrations of the higher teaching institutions who feared the Academy's special position in the area of basic research. This opposition arose partly from the overly traditional understanding of the tasks and structure of contemporary science and the underestimation of the need to concentrate large forces and means on research, particularly experimental, which exceeds the capabilities of the teaching institutions. In part they are also the result of mistakes made in forming the network of Polish Academy of Sciences centers, consisting of creating independent centers in those fields also which could have been properly pursued by the college groups. Some of these decisions should be reexamined, mainly in relation to social sciences.

To Contribute to the Development of Science as a Whole

/The Academy intends to continue to conduct research in selected fields and to assist the development of Polish science as a whole, but it does not claim to manage it administratively in any form. If we feel a responsibility to stimulate, coordinate and jointly finance basic research, it is primarily because the Polish Academy of Sciences has available to it, as the only institution in the country, a uniform, encompassing all fields of science, system of scientific committees, assembling several thousand scholars from higher schools and institutes. We want to strengthen the representative character of this system and to enlarge the scope of its authority, thus creating a democratic and self-governing platform for shaping the opinions and decisions concerning the most important problems of Poland's scientific life.

The Polish Academy of Sciences is one of the institutions of a socialist society which assists in its intellectual and economic development./ Discussions on the new form of the law on the Polish Academy of Sciences contribute to the improvement of its structure and form of action. We base our activities on the traditions of Polish science and on the achievements of contemporary researchers. /In our concern for the development of science and the right to be free to search creatively, we are also making our intellectual potential available to society and the political authorities.

This competent and collegiately organized group of scientific advisors is ready to take an active part in solving the difficult problems facing Poland./

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ACTIVITY OF CENTER FOR AERONAUTICAL MEDICINE DISCUSSED

Bucharest REVISTA SANITARA MILITARA in Romanian No 4, Oct-Nov-Dec 81 pp 477-480

["Data on the Historic Center for Aeronautical Medicine," by Dr Corneliu Ionescu, Medical Colonel Dr Marin Anton]

[Excerpts] Established on 6 August 1920, the Center for Aeronautical Medicine in Bucharest is one of the few institutions of its kind in the world.

Today the Center for Aeronautical Medicine has a modern material base, a new multifunctional building, examination equipment representing, for the most part, the latest achievements of specialized technology. Some devices and means of investigation are original; they have been constructed in Romania according to the directions of doctors and psychologists from the Center for Aeronautical Medicine. The center's laboratory for functional studies, the laboratory for psychophysiology, the clinical laboratory and the vestibulometry laboratory use highly perfected methods of investigation and are equipped at a level which places them among the best laboratories compared with those in similar institutions in other countries.

Examinations in the area of aeronautical medicine are executed in a creative manner by tireless scientific research work, reflected in works compiled and published in various reviews in the country or communicated in symposiums, conferences or international congresses. In addition, the scientific collaboration with specialized institutes of the Academy of the Socialist Republic of Romania, with the clinics of the Ministry of Health and with the clinical sections of the Central Military Hospital has been enriched considerably. Also, the Center for Aeronautical Medicine participated actively in the medical selection and training program of the Romanian cosmonaut candidates in 1978.

The continued perfecting of the techniques of investigation and professional training, as well as political and ideological training, are the objectives of the personnel of the Center for Aeronautical Medicine, which, in the final analysis, are reflected in the good results obtained in ensuring the medical safety of flight.

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YUGOSLAVIA

BRIEFS

MOLECULAR GENETICS INSTITUTE IN SPLIT--It has been decided that the International Institute for Molecular Genetics will be housed in the "Dalmacija" villa in Split. This was discussed on Thursday at a meeting of the [Croatian] Republic Committee for Science, Technology, and Information in Zagreb. A special council of the Yugoslav Academy of Art and Science and the University in Split, the founders of this institute, made this decision, thereby providing Yugoslavia with a high-level center for molecular genetics which would be assisted financially and professionally by international scientific organizations and which would be headed by our specialists who have been recognized and are now working abroad. [Excerpt] [Zagreb VJESNIK in Serbo-Croatian 5 Feb 82 p 12]

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DATE FILMED

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